NEWEST SCIENTIFIC DISCOVERIES & REMARKABLE FACTS

DEATH Rate in Wounded Is Mounting High as War Goes on

MODERN inhuman methods of warfare are blamed by British surgeons and government officials for a death rate among wounded soldiers greater than any previous war.

Premier Asquith called attention in Parliament to the fact that nearly 24 per cent of the soldiers wounded in battle die from complications that follow. In the Crimean war only 22 per cent of wounds were fatal, in spite of appalling insanitary conditions. This proportion was reduced to 20 per cent during the Boer war. Forty-four years ago in the Franco-Prussian war Germany lost but 17.53 per cent of her wounded.

Trench fighting in the present conflict results in more injuries from shrapnel and shells. Rifle bullet wounds, prevalent in previous wars, now are comparatively rare. The most terrible feature, however, is the impossibility to secure assistance in time. Wounded soldiers, falling between trenches, must lie there for hours and sometimes days before they can be reached and attention given them. To remedy this a truce has been suggested, operative at certain hours and permitting the removal of wounded by the contending enemies.

Hospital conditions in the battle of Waterloo were equally as good as in the present war, if a report made by a famous Edinburgh surgeon is to be considered in a comparison.

"No contagious fevers existed in any of the hospitals of Brussels or Antwerp," he wrote. "The great attention given to cleanliness and to ventilation must undoubtedly have had powerful influence in preventing the occurrence of contagious diseases."

Wounds produced by canister and grape shot in the battle of Waterloo were accompanied by terrible results. But hospital conditions of 100 years ago, limited though they were, adequately handled the cases and avoided overcrowding.

Balloon 'Comes Back' as Weapon of Modern War

THE captive balloon is playing an astonishing role in this war. It was first used in maneuvers for signaling purposes only. Aviators did all the work. It was taken into this war as something antiquated. But it has come to unexpected honor, thanks to the conditions of modern warfare. Captive balloons are to be seen all along the front and their value is great. They carry aloft whole batteries of photographic apparatus.

The aviator, soaring through the air at a tremendous speed, has not the leisure to make the observations possible to the man in the balloon. The balloon is stationary. It remains on the spot for hours and even for days. Even if the observer suffers from the equivalent of sea sickness he remains aloft. He is the eye of the artillery. He watches every move of the opponent, the flashes of his guns and controls the fire of his own. But his perch is most dangerous. Shrapnel and shell search constantly for his range and elevation, which have to be altered at frequent intervals. They rarely find their mark, but the balloon sometimes has to be removed to a distance.

The whole landscape is spread out before the balloonist as one gigantic battlefield, but not a living soul is to be seen. Man is hiding from man, crouching in holes in the ground, all animated with only one thought—to kill.

Germany is organizing in various central countries sales of objects stolen in France and Belgium, and advertisements are appearing in Danish, Swiss, Norwegian, and other newspapers announcing the sale of valuable works of art, pictures, and even clothing.

Your GARBAGE Plays an Important Part in CYCLE of FOOD

BY the simple process of conservation, the garbage from your kitchen today stands in a fair way to grow a part of your meal tomorrow. Its ingredients are highly nutritive as fertilizer, though certain greases recovered in rendering are found even more valuable for soaps and lubricants.

In its cycle of existence, your foodstuff originates on the farm, the garbage you reject turns a neat profit for the rendering plant and is sold back to the farmer to enrich his soil and help him grow new grain, vegetables and fruit. Government estimates show that nearly 4 cents a pound was obtained in Columbus, O., in 1913 for garbage greases sold to manufacturers of soap.

Garbage reduction plants reap an average profit of 89 cents a ton; the cost of reduction is $2.41 a ton and gross receipts $3.30 a ton. Incinerating plants consider garbage worth 22 cents a ton for the power generated while it burns, additional to the profit from its later sale.

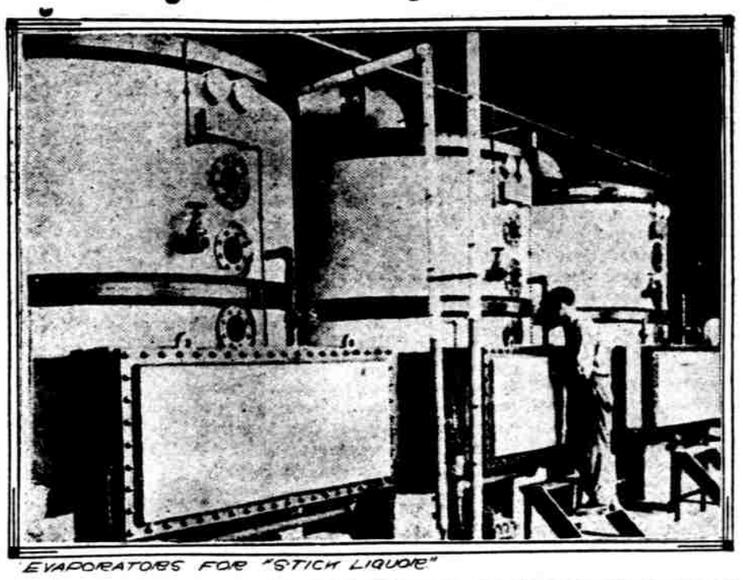
According to government investigation fertilizer must contain "plant foods"—potash, phosphoric acid, nitrogen and lime. Contributing to these essentials are ammonium sulphate, a product recoverable from coal when it is distilled to prepare illuminating gas, constituting the greatest source of nitrogen for fertilizer; cottonseed meal, the greatest of organic carriers; blood and other waste materials from slaughterhouses; abundant fish not regarded as fit for food, from which is prepared fish scrap; garbage tankage, as the lower grade of organic carriers.

Thus a city contributes its waste to further its life by turning into fertilizer ashes, rubbish, sewage, street sweepings, dead animals and garbage. Sewage sludge moistens the soil and bears an essence of nitrogen. Street sweepings are mostly used for filling, a use to which they are adapted, since they contain large quantities of mineral matter and carry sufficient organic matter to insure rapid growth of vegetation over fills. The bureau of chemistry once figured that 169 tons of sweepings were obtained annually for every 1,000 inhabitants of a city, bringing a total of 5,000,000 tons annually for 199 cities with populations over 30,000. Since the advent of the automobile, however, the value of street sweepings for fertilizer has been lessened because of the oil dropped, deleterious for agricultural purposes.

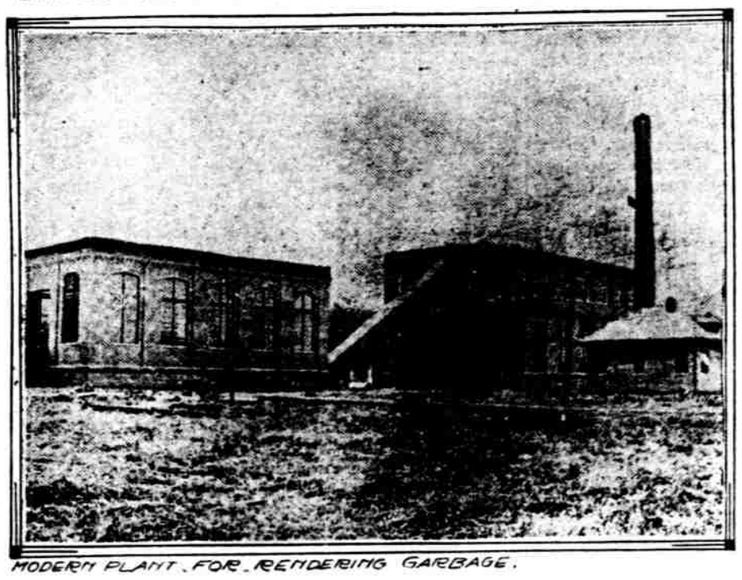
Dead animals have such value for the manufacture of fertilizer that any other method of disposing of them is condemned by the government. The fertilizers obtained from them are equal, if not superior, to those obtained from high grade slaughterhouse tankage. Various methods of disposing of a city's dead animals are in vogue at present, such as burying, cremating and rendering.

Rendering is commended since it is the only method by which revenue is derivable. Cremation has a value only when an animal has died of some communicable disease. Dead animal tankage is prepared by rendering; the carcasses, in the case of large animals, are skinned for the preservation of the hides, cut up and cooked in steam at high temperatures. Products thus obtained are hides, bones, grease and tankage. It is stated that these products, as recovered from a horse of average size and condition, have a total value of about $10.

Garbage, however, offers the greatest single waste factor with which a city has to deal. Rendering for the preparation of grease and fertilizer consists essentially in cooking in steam, pressing to remove water and grease, drying, extracting, washing with gasoline and grinding. Statistics of 1909 show that approximately 2,700,000 tons of garbage were collected in cities having population of more than 30,000 and, rendered, yielded 400,000 tons of dry tankage, of a value of $2,500,000.



EVAPORATORS FOR "STICK LIQUOR"



MODERN PLANT FOR RENDERING GARBAGE.

SACRED CITY of Guatemala to Be Perpetuated in CASTS

TEMPLE COURT, the religious center of the sacred city of Quirigua, in Guatemala, will be perpetuated at Smithsonian institution in plaster casts. Neil M. Judd is in charge of work to reproduce in exact replica the huge stone monuments that make up the world-famous ruins.

Furthering his investigations for the National museum, Judd recently headed an expedition into the jungles of Guatemala to ascertain anthropological possibilities among the Indian tribes. He found little surviving in the historic tribes to indicate the strength and magnificence of the Quiche empire which Pedro de Alvardo destroyed in 1523. The races are now fast disappearing, he reported.

Smithsonian has conducted a number of interesting expeditions recently, covering researches in fifteen different countries on every continent of the globe and in seventeen states of this country.

Charles D. Wolcott, after investigations in British Columbia and Montana, discovered near Helena the remains of crab-like animals, suggesting in form the fresh water cray-fishes. "These fossils," says Dr. Wolcott, "are the oldest animal remains now known, and the algal deposits which occur at intervals for several thousand feet below the shales containing the crustaceans, are the oldest authentic vegetable remains. It is also most interesting that two types of bacteria have been found in a fossil state in the rock in association with the algal remains."

Excavations at the cave deposit near Cumberland, Md., added to the already important collection from this region over 400 specimens of fossil animals, deposited there in far-off Pleistocene time. Among these was a practically complete skeleton of the large, extinct peccary, measuring more than four feet in length, a partial skull of a wolverine, and several skulls of extinct species of the black bear.

In distant Celebes, Malay Archipelago, H. C. Raven captured a specimen of babirussa, a pig with peculiar, erect tusks, curved backward above the forehead. Specimens from Borneo sent in by Raven to the National museum number more than 3,000 animals and birds.

The largest steam hammer in the world is in the gun factory at Woolwich arsenal. It is capable of striking a blow of nearly 1,000 tons, yet it is so carefully adjusted and accurately timed that it is possible to place a nut underneath the huge hammer and to crack the shell without injuring the kernel.

Bridge Across Atlantic ONCE

THAT the North American continent once was bridged across the Atlantic from Newfoundland to Great Britain and thence to Scandinavia, is the theory advanced by geological experts of Princeton University. An expedition to secure proof of this is active at the present time.

Professor Gilbert Van Ingen, who has been here with two similar expeditions, found fossils bearing a marked resemblance to those unearthed in Wales and Sweden. This led him to formulate the theory that in prehistoric times it may have been possible for animals to travel on dry land across what now is the Atlantic Ocean.

He considered that this idea was supported by the fact that an underwater shelf of rock, upon which many telegraph cables have been laid in recent years, extends across the Atlantic.

Get MORE LIGHT by Cleaning Lamps

THE careless housewife, who fails to clean the dust from electric lamps and shades, cheats herself of money and light. Dust absorbs light. If lamps are not kept clean they do not give as much light as you are paying for and such light, absorbed by tiny particles of dust, is absolutely lost.

By wiping off the lamps and shades with a clean, damp cloth at frequent intervals a maximum of lighting efficiency results. Reflectors should be cleaned with soap and water.

MEDICAL Reserve Corps of the U. S. ARMY Grossly NEGLECTED

LIKE all other branches of the military service, the Medical Reserve Corps of the U. S. Army has been grossly neglected. When the corps was formed, a great many medical men hastened to enroll themselves, but this is about as far as the corps has progressed. The government, apparently, has taken little interest in the Medical Reserve. In New York, Chicago and St. Louis, the organizations have arranged for lectures at long intervals by officers of the Army Medical Corps and a few members have become interested enough to seek out the required knowledge at military posts.

The war department, it is true, is ready to furnish on application certain standard works useful to members of the reserve, but no attempt has been made to push the circulation of these works and consequently they have found their way into the hands of a pitifully small number of the enthusiastic physicians and surgeons who enrolled in the reserve.

This year summer camps of instruction were established in several places. While the attendance at these camps was not large, they were undoubtedly a step in the right direction; they were evidence that the government appreciates the necessity of giving to reserve medical officers technical instruction in their duties and that the officers themselves welcome the long deferred instruction. Realizing that much could not be expected from nonmilitary medical men who wished to become soldiers, the instructors did not attempt to feed them with higher tactics, but began with the simpler litter drill, and similar elementary work.

The work of these camps of instruction, while relatively elementary, is as necessary to the medico-military neophyte as is the study of anatomy to the medical student or the "three Rs" to the school child. It is hoped that the handicap which existed this year will be removed before next summer, and that the officers of the Medical Reserve Corps, who wish to learn more of the duties pertaining to their position, may not be obliged to furnish their own transportation and subsistence, but may be placed for purposes of training on the active list of the Medical Reserve Corps and thereby be entitled to transportation and the pay of their grade.

If opportunity should be given to all officers of the corps to come under instruction next summer, the additional expense to the government would be repaid many times by the enthusiastic cooperation of the officers who take the course, and by their increase in efficiency.

The interest manifested by the officers who took the course of instruction this summer, the eagerness with which they absorbed information, the desire shown by many to return for subsequent courses, all indicate that the Medical Reserve Corps of the army, inactive list, takes its position seriously and believes that it is its patriotic duty to become efficient, so that in time of its country's need it will not be found wanting.

Daylight Searchlights Are Part of Coast Defense

DAYLIGHT searchlights are important parts of the United States coast defense system in peace times, and probably will be employed should the necessity arise for this country to go to war with a foreign power. Searchlights are now used in the day time for signal work, the signals being sent to tugs towing the targets on which the coast defense guards practice gunnery. The searchlights are turned directly on the tugs, and dots and dashes are transmitted by means of a shutter. The tug answers with its whistle, the smoke puffs being visible even when the sound cannot be heard.

In case of war, it is likely that the same system would be used to communicate with scout boats too small to carry wireless, or possibly with small aeroplanes not equipped with radio apparatus.

One of the most important parts of the coast artillery drill is target practice, not alone with service charges, but in subcaliber work, where an inner tube placed inside a big disappearing gun and firing a one-pound shot gives a means of excellent practice, without the great expense of firing service charge.

For this it is necessary to have targets. These targets are towed by tugs. The targets are necessary also for the training of the range sections, for the observers manning the delicate instruments used for position finding must have practice and they cannot always depend upon passing vessels for practice.

The big canvas targets are mounted on pontoons. The tug captains must follow certain courses, but for many reasons it is necessary to have signal communication between tug and shore. Sometimes, for instance, the fort commander, in his own station, will want to direct the tug to change its course so that his battery commander may have plenty of practice at constantly changing ranges. To do this he must be able to get into communication with the tugs.

With vessels close in shore, it is easy to use the wig-wag. But when the tug is running on a course that takes her from six thousand to fourteen thousand yards off shore, the flag cannot be seen distinctly. If the tug is a large vessel, she sometimes is equipped with wireless apparatus, but this is the exception.

The great amount of electricity power used to operate the arcs of the large searchlights precludes the possibility of making use of a telegraphic key of any sort, so a shutter is used and the light is kept burning. This shutter is like an ordinary window shutter, made up of a number of small overlapping leaves, which are opened and closed by a lever connecting them all. With this shutter the dots and dashes of the general service code are spelled out.

UNLIMITED Supply of Fast Dyes FOUND in MEXICO, but U. S. Has ALWAYS IGNORED It

WITH chemists busily engaged in the concoction of new and fast colors and manufacturers in various lines suffering from the dearth in dyestuffs because of the European war, an unlimited source of fast color supply lies at the very door of America. Mexico has untold quantities of the woods which make the world's best dyes.

American chemical concerns have made rapid strides in the production and development of dyes since the war began, but the opportunity Mexico offers for securing nature's own coloring fluid has, until recently, gone unnoticed. The government is opening up this trade with Mexico.

Wood dyes are absolutely fast. Aniline dyes, for the most part now in use, are affected by weather conditions and likely to fade.

Carmen, in the bay of Campeche, is the principal trading port in the timberland section of extremely lower Mexico. From here Germany, England, Spain and Holland have secured quantities of woods in past years; United States has taken but little advantage of the supply.

R. E. Becker, a Cincinnati man who toured lower Mexico extensively, reports of his discoveries: "On a side trip up the Palisada river, I saw numerous long, low buildings packed solidly with logwood and orange woods. I was told these were the basic woods for producing all varieties of fast colors and had been used for many years by the German and English cloth and wool manufacturers, but that since aniline dyes were made from petroleum at less cost there had been a falling off in the demand for wood dyes and consequently it was accumulating with little chance to market."

The Mexicans use logwood for making a uniform color on mahogany for furniture and interior decoration of churches and public buildings. As in most other lines, Germany has brought her trade in dyewoods up to a remarkably high standard. Her consular agents in this section of Mexico are well paid and have sufficient assistance to promote profitable commerce and good transportation facilities. The war, however, makes it increasingly difficult to carry on this commerce and opens the way for America's benefit.

Sacred Candle Escapes Shells

ONE of the few of the historic relics which escaped the bombardment of Arras was a candle reputed to be one hundred years old. The candle is in the ancient church, Notre Dame des Ardents, which also came uninjured through the bombardment.

The relic is known as the Holy Candle. It is guarded in a richly-enameled silver casket, made to the order of Jean de Sasquepee, lord of Baudimont, and owner of Arras, and a curious history is attached to it. It appears that in May, 1105, the Holy Virgin appeared during the night to two minstrels.

A terrible plague depopulated Arras at that time, and the Virgin—so goes the legend—gave the two minstrels a candle, which they in turn gave to Bishop Lambert, of Arras, says the Evening Standard, and told them that the hot wax of this candle mixed with pure water would cure the inhabitants of Arras of the dreadful malady.

The remedy proved efficacious, and a grateful populace erected the Monastery of Ardents. The candle has been carefully guarded, and it is the firm belief of the inhabitants of Arras that it frequently saved them from utter destruction.

GOLF Machine BOON to Many

GOLF on your front porch, down in the cellar or up in the attic is now perfectly feasible. One or a hundred can play. And you don't need a great variety of sticks.

A machine has been invented which

ought to put golf within the reach of everyone. Neither rain nor blistering sun interferes. The machine occupies little space, makes less noise and is absolutely reliable—far more so than a caddy. You can't lose the ball.

A golf ball is fastened to the end of a lever which in turn is attached to a disk dial. The strength with which you hit the ball is registered, also the approximate distance the ball would travel. But that is not all. Another register shows whether the ball would go high or low, clear a bunker or fall into a stream.

The indoor golf machine is ideal in many ways. And it never wanders far from the clubhouse.

MINIATURE TORPEDOES USED by Kaiser

THE fact that it takes from ten months to a year to construct a torpedo may account for the sparing use of them by some of the belligerent nations. Germany's reckless expenditure of this highly expensive and tediously made instrument of destruction has amazed the world, but it has just come to light that the kaiser is not wasting $15,000 torpedoes of 10,000-yard range on little 900-ton coasting steamers and trawlers.

The Germans, as soon as they embarked on their famous submarine blockade, began turning out torpedoes in five months' time. These, instead of carrying 250 to 300 pounds of guncotton, carry a charge of 100 pounds or less. They have a range of only 1,000 to 1,500 yards, so that much of the intricate steering and propelling mechanism is omitted. These new miniature torpedoes cost only $2,500, and are ably ample to blow up the small merchant vessels which have been the chief victims of the blockade.

Germany, too, manufactures a sort of intermediate torpedo, with a range of 4,000 to 7,000 yards, that costs about $6,500.

WAR Hits DRUG VICTIMS Hard

THROUGH the war, more effective than a crusade, the drug habit in France is, by nature of events, on the wane. Medical experts credit mobilization of armies with the progress made. Purveyors of morphine and other drugs now find them almost impossible to obtain. The sufferings of some as a consequence of this compulsory weaning have been so great as to send many habitual drug users to hospitals for treatment and cure.

Mobilization, however, has drawn a great many men previously addicted to the use of drugs into the army, and for this reason there are fewer men than women in the hospitals taking the drug cure. As to those in the army, some have failed to break the habit; others, being no longer able to obtain morphine, have been cured by force of events; the army has had over them a great moral influence.

M. Briand brought this subject up before the French royal medical society and, in discussion, averred that a morphinomaniac may be a good soldier if he is judiciously supplied with morphine before setting out. If, in spite of this, he fails, he is a sick person to be sent to the hospital and treated like any other military patient. Those who, to escape their duty, take a large dose and fall into a torpor, he held, should be classed with the soldier who voluntarily mutilates himself to escape service.

How to FIGURE SHIP'S Tonnage

THERE is a great deal of confusion in the public mind regarding the "tonnage" or "displacement" of ships, and with good reason, for there are four distinct methods of calculating tonnage. In the case of warships, the term displacement is almost always used. The displacement tonnage is the space occupied by the vessel in the water. The amount of water displaced by the ship is equal in weight to the ship and all it contains. As one ton is equal to thirty-five cubic feet of water, the displacement tonnage is found by dividing the number of cubic feet of water displaced by thirty-five, when the ship is immersed up to its load line.

Gross tonnage is a term commonly applied to merchantment. In calculating it, the whole interior capacity of the ship below the tonnage deck is found, including that of all covered-in spaces on deck used for stowage, and the result in cubic feet is divided by 100. Net register tonnage is the gross tonnage minus all the spaces used for the accommodation of the crew and instruments and the working parts of the ship. The deadweight tonnage is the measure of the exact amount of cargo a ship can carry with safety.

Births in War Time

IT IS a popular belief that more boys than girls are born in time of war.

According to a well known London doctor, however, there is little ground for such an idea. He declares he worked in a district where the strain of war was felt very much because it provided a large proportion of its population to British fighting forces. He found in six months of cases he attended 55 per cent of the births were girls and 45 per cent boys.